No. 9500281

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Purdue University Agricultural Research Programs

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. 542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

*WHEAT*

*'Patterson'*

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of Washington, D.C. this thirtieth day of January in the year of our Lord one thousand nine hundred and ninety-six.*

Attest:

Marsha A. Stanton
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions.* FORM APPROVED - OMB NO. 0581-00

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION - PLANT VARIETY PROTECTION OFFICE

# APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

*(Instructions and information collection burden statement on reverse)*

*The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a).*

*Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).*

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Director, Purdue University
Agricultural Research Programs

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
P80311A1-20-3-31

3. VARIETY NAME
Patterson

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
1140 Ag. Administration Bldg.
Purdue University
West Lafayette, IN 47907-1140

5. TELEPHONE *(include area code)*
(317) 494-8366

6. FAX *(include area code)*
(317) 494-0808

**FOR OFFICIAL USE ONLY**

PVPO NUMBER
9500281

FILING DATE
Aug 23, 1995

FEE RECEIVED
FILING AND EXAMINATION FEE:
$ 2450.00
DATE
August 23 1995
CERTIFICATION FEE:
$ 120.00
DATE
Dec 28 1995

7. GENUS AND SPECIES NAME
Triticum aestivum

8. FAMILY NAME *(Botanical)*
Gramineae

9. CROP KIND NAME *(Common name)*
Wheat

10. IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.) (Common name)*
Purdue University Agricultural Research Programs

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Established by Federal Law (Hatch Act)

12. DATE OF INCORPORATION
1889

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dr. Eldon E. Ortman
Purdue University
Agricultural Research Programs
1140 Ag. Administration Bldg.
West Lafayette, IN 47907-1140

14. TELEPHONE *(include area code)*
(317) 494-8366

15. FAX *(include area code)*
(317) 494-0808

16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow instructions on reverse)*

a. ☒ Exhibit A. Origin and Breeding History of the Variety
b. ☒ Exhibit B. Statement of Distinctness
c. ☒ Exhibit C. Objective Description of the Variety
d. ☒ Exhibit D. Additional Description of the Variety
e. ☒ Exhibit E. Statement of the Basis of the Applicant's Ownership
f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in a public repository)*
g. ☒ Filing and Examination Fee ($2,450), made payable to "Treasurer of the United States" *(Mail to PVPO)*

17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act)?*
☒ YES *(If "yes," answer items 18 and 19 below)* ☐ NO *(If "no," go to item 20)*

18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO

19. IF "YES" TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ FOUNDATION ☐ REGISTERED ☒ CERTIFIED

20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES *(If "yes," give names of countries and dates)* ☒ NO

21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned applicant(s) is(are) the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

| SIGNATURE OF APPLICANT *(Owner(s))* | | SIGNATURE OF APPLICANT *(Owner(s))* | |
|---|---|---|---|
| Eldon Ortman | | | |
| NAME *(Please print or type)* | | NAME *(Please print or type)* | |
| ELDON ORTMAN | | | |
| CAPACITY OR TITLE | DATE | CAPACITY OR TITLE | DATE |
| Assoc Dir. ARP | 8/4/95 | | / |

SD-470 (04-95) *(Previous editions are to be destroyed)*

*(See reverse for instructions and information collection burden statement)*

**16 a. Exhibit A. Origin and Breeding History of Patterson**

Patterson was developed by the Purdue University Agricultural Research Programs in cooperation with the USDA-ARS. Patterson, tested as the line P80311A1-20-3-31, was selected from the cross P69184B8-21-1-1-2-4*2/Caldwell. Parentage of the inbred parent line P69184B8-21-1-1-2-4 (P69184) is: Knox 62//CI 13110/Knox/3/Norin 10//Knox/CI 13110/13/Siete Cerros/11/Arthur/10/Norin33/5/Fairfield/4/PI 94587//CI 11512/CI 4830/3/CI 11512/CI 4830/8/Knox*4/7/CI 13110/6/Knox/5/Fairfield/4/PI 94587//CI 11512/CI 4830/3/CI 11512/CI 4830/9/Arthur/Elmo/12/Riley*2/Bulgaria 88. P69184 has excellent soft wheat milling and baking qualities, is very winterhardy, has resistance to leaf rust, Septoria leaf blotch and soil borne mosaic.

Patterson was developed by the pedigree breeding method with plant selections made in F2, F3, and F9 generations. The line is the selfed progeny of a F9 plant selected in 1988. Foundation seed produced in 1995 is the F17 generation. Seed for commercial production will be available for seeding in Fall of 1996. Patterson has been uniform and true breeding during development of Breeder and Foundation seed, although up to 0.2% of variant plants may be present. Variant plants may have awns and/or brown glumes in contrast to Patterson which is awnletted and has yellow glumes.

The parent line, Siete Cerros, was developed at CIMMYT (International Center for Maize and Wheat Improvement, Mexico). Siete Cerros is a spring wheat and used as a parent for its resistance to leaf rust and for early maturity.

The parent line, Norin 33, was introduced in the 1930s to Washington State University. Norin 33 is a semidwarf line similar to Norin, Norin 10 and Norin 66, originating from the Norin Research Station in Japan. Norin 33 was first used in crosses at Purdue in 1948.

The parent line, Bulgaria 88 (PI 94407), originated from Bulgaria, and was used as a source of resistance to *Septoria tritici*.

The parent line, Elmo (CI 17887), is a germplasm line developed at Purdue University. Crop Sci. 21:803.

**16 b. Exhibit B. Novelty Statement**

Patterson is most similar to Caldwell in plant type. It differs from Caldwell in the following characteristics: Patterson has pigmentation in the coleoptile (coleoptiles are purple), Caldwell does not have pigmentation (coleoptiles are green). Patterson heads 3 days earlier than Caldwell (Table 1) at Lafayette, IN, and ranges from 2 days earlier than Caldwell in northern Indiana to 4 days earlier than Caldwell in southern Indiana. In any test at locations in Indiana and adjacent areas in surrounding states, Patterson is earlier than Caldwell with no overlapping statistical classes of heading date. Patterson carries an unidentified gene(s), but not *Sr31*, that confers seedling resistance to stem rust caused by *Puccinia graminis*, Caldwell carries gene *Sr31*.

Patterson is early, like Clark, but Patterson has yellow glumes at maturity and Clark has brown glumes. Patterson has adult plant resistance to leaf rust, caused by *Puccinia recondita* and Clark is susceptible.

Patterson is 4 days earlier than Arthur, Roland (Crop Sci. 23:1013-1014) is 2 days later than Arthur. Roland has gene *H3* for resistance to Hessian fly biotypes GP, A and C, but Patterson has genes *H5* and *H6* for resistance to biotypes GP, A, B, C, and D.

Severn (Crop Sci. 22:1264-1265) is similar to Arthur in maturity, 4 days later than Patterson. Severn was susceptible to prevalent races of *Puccinia recondita* in eastern US, when it was released in 1981, so is highly likely also susceptible in 1995, although we have not tested Severn in our tests. Patterson in the adult plant stage has resistance to leaf rust in eastern US.

9500281

# PURDUE UNIVERSITY

DEPARTMENT OF AGRONOMY
CROP, SOIL & ENVIRONMENTAL SCIENCES

27 November 1995

Alan A. Atchley, Plant Variety Examiner
Plant Variety Protection Office
NAL Building, Room 500
10301 Baltimore Blvd.
Beltsville, MD 20705-2351

Dear Dr. Atchley:

Subject: PV Application No. 9500281, wheat, 'Patterson'

I apologize for the delay in responding to your memo of 3 October 1995 requesting clarification of color differences between cultivar Patterson and reference cultivars for glume color and coleoptile color.

Exhibit B: The color of the coleoptile of Patterson is: (Hue 10R, Value 3, Chroma 4) that of Caldwell is: (Hue 7.5 GY, Value 4, Chroma 4) (ref. Munsell Book of Color).

Although Patterson is most similar to Caldwell for general plant type, Patterson is most similar to Clark for maturity, but Patterson is easily distinguishable from Clark because Patterson has 'yellow' (Hue 10 YR, Value 8, Chroma 4) glumes at maturity and Clark has reddish brown (Hue 7.5 YR, Value 5, Chroma 6) glumes at maturity (ref. Munsell Book of Color).

Sincerely,

Herb Ohm

Herbert W. Ohm
Professor

1150 LILLY HALL OF LIFE SCIENCES • WEST LAFAYETTE, IN 47907-1150 • (317) 494-4772 • FAX (317) 496-1368

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FORM APPROVED: OMB NO. 0581-0066

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

# OBJECTIVE DESCRIPTION OF VARIETY
## WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Director, Purdue University Agricultural Research Programs

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
1140 Ag. Administration Bldg.
Purdue University
West Lafayette, IN 47907-1140

FOR OFFICIAL USE ONLY

PVPO NUMBER 9500281

VARIETY NAME OR TEMPORARY DESIGNATION
Patterson

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (*e.g.* [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

**1. KIND:**
[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

**2. TYPE:**
[2] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____ [1] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

**3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:**
[2][2][4] FIRST FLOWERING [2][2][7] LAST FLOWERING

**4. MATURITY (*50% Flowering*):**
[0][4] NO. OF DAYS *EARLIER* THAN ..... [1] 1 = ARTHUR 2 = SCOUT 3 = CHRIS
[–][–] NO. OF DAYS *LATER* THAN ..... [–] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

**5. PLANT HEIGHT (*From soil level to top of head*):**
[ ][9][4] CM. HIGH
[ ][5] CM. TALLER THAN ..... [1]
[–][–] CM. SHORTER THAN ..... [–] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

**6. PLANT COLOR AT BOOTING (*See reverse*):**
[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

**7. ANTHER COLOR:**
[1] 1 = YELLOW 2 = PURPLE

**8. STEM:**
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[2] Waxy bloom: 1 = ABSENT 2 = PRESENT
[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT
[1] Internodes: 1 = HOLLOW 2 = SOLID
[0][4] NO. OF NODES (*Originating from node above ground*)
[2][3] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

**9. AURICLES:**
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[1] Hairiness: 1 = ABSENT 2 = PRESENT

**10. LEAF:**
[1] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____
[1] Flag leaf: 1 = NOT TWISTED 2 = TWISTED
[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
[1][2] MM. LEAF WIDTH (*First leaf below flag leaf*)
[2][2] CM. LEAF LENGTH (*First leaf below flag leaf*):

9500281

11. HEAD:

[1] Density: 1 = LAX 2 = DENSE

[1] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) _____

[2] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[2] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[ ][8] CM. LENGTH.

[1][3] MM. WIDTH

12. GLUMES AT MATURITY:

[2] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[2] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[4] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[1] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[3] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[2] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[ ] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[ ][6] MM. LENGTH [ ][4] MM. WIDTH [3][5] GM. PER 1000 SEEDS

17. SEED CREASE:

[2] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LENHI'

[2] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LENHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[2] STEM RUST (Races) unidentified [2] LEAF RUST (Races) Adult plant resistance [0] STRIPE RUST (Races) _____ [0] LOOSE SMUT

[1] POWDERY MILDEW [0] BUNT [ ] OTHER (Specify) _____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID (Bydv.) [0] GREEN BUG [0] CEREAL LEAF BEETLE

[ ] OTHER (Specify) _____ HESSIAN FLY RACES: [2] GP [2] A [2] B [2] C [2] D [0] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

| CHARACTER | NAME OF VARIETY | CHARACTER | NAME OF VARIETY |
|---|---|---|---|
| Plant tillering | Caldwell | Seed size | Caldwell |
| Leaf size | Caldwell | Seed shape | Caldwell |
| Leaf color | Caldwell | Coleoptile elongation | Caldwell |
| Leaf carriage | Caldwell | Seedling pigmentation | Caldwell |

## INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

**16 d. Exhibit D. Description of Additional Characteristics**

Patterson is a common soft red winter wheat cultivar. Significant contributions of Patterson are high yield potential combined with resistance to several important fungal diseases and viruses (Tables 1 to 5). Patterson has consistently placed at or near the top of regional as well as Indiana performance tests. Patterson is very winterhardy like Auburn, has excellent soft wheat milling and baking qualities like Caldwell and, like Clark, is one of the earliest heading cultivars available. Patterson has resistance to leaf rust, stem rust, soilborne mosaic, wheat spindle streak mosaic, Hessian fly biotypes GP, A, B, C and D (carries genes *H5* and *H6*), and tolerance to take-all, but is moderately susceptible to powdery mildew caused by *Erysiphe graminis*.

**16 e. Exhibit E. Statement of Basis of Applicants's Ownership**

The variety Patterson for which Plant Variety Protection is hereby sought was developed by Dr. Herbert W. Ohm, an employee of Purdue University. By agreement between employees and Purdue University, all rights to any invention, discovery, or development made by the employee while employed by Purdue University, were assigned to Purdue University, with no rights of any kind pertaining to the variety Patterson being retained by the employees.

Table 1. Performance of wheat cultivars at Lafayette, IN, averaged over 5 years, 1995, 1994, 1993, 1991, 1990.[†]

| Cultivar | Yield | T.W. | Headed | Height | Straw Score |
|---|---|---|---|---|---|
| | bu/a | lb/bu | May | in | 0-9 |
| Patterson | 78.9 | 58.6 | 15 | 37 | 3.7 |
| 84152B1-14-5-1-15 | 73.7 | 57.9 | 18 | 34 | 3.3 |
| Grant | 72.9 | 55.7 | 19 | 34 | 2.9 |
| INW9451 | 72.6 | 58.8 | 20 | 36 | 3.9 |
| INW9241 | 71.4 | 56.8 | 17 | 36 | 3.4 |
| Clark | 68.8 | 56.5 | 15 | 36 | 3.1 |
| Caldwell | 66.4 | 57.4 | 18 | 35 | 3.6 |
| Auburn | 60.9 | 58.1 | 20 | 37 | 3.9 |
| Abe | 56.9 | 59.5 | 19 | 35 | 5.5 |
| LSD .05[‡] | 6.4 | 1.4 | 1 | 2 | - |
| C.V. | 7.2 | 1.9 | 6 | 5 | - |

[†] Genotype x year mean squares were used as demoninator in F-tests, thus, conservative tests. Values of the 4 replications in each year were averaged.

[‡] Steel, G.D., and J.H. Torrie. 1960. Principles and Procedures of Statistics. p. 106. McGraw-Hill, New York, N.Y.

Table 2. Milling and baking qualities of selected soft red winter wheat cultivars.[1]

| | Milling score | Baking score | Adj yield | Protein % | AWRC % | ESI |
|---|---|---|---|---|---|---|
| | | | 1993, Lafayette, IN nursery trials | | | |
| Patterson | 105.5 | 104.6 | 74.5 | 8.8 | 54.8 | 59.0 |
| Caldwell, std | 100.0 | 100.0 | 74.0 | 8.7 | 54.7 | 60.9 |
| Clark | 98.5 | 91.7 | 72.6 | 9.1 | 55.9 | 56.6 |
| Grant | 100.2 | 98.8 | 73.1 | 9.3 | 55.5 | 62.6 |
| Arthur | 97.7 | 90.7 | 72.4 | 9.1 | 55.6 | 55.2 |
| | | | 1994, Lafayette, IN nursery trials | | | |
| Patterson | 101.2 | 96.4 | 73.6 | 10.0 | 53.7 | 53.1 |
| Caldwell, std | 100.0 | 100.0 | 73.2 | 9.5 | 52.7 | 57.2 |
| Clark | 89.4 | 86.8 | 70.0 | 11.0 | 55.6 | 50.3 |
| Grant | 101.1 | 99.6 | 73.5 | 8.4 | 54.6 | 59.7 |
| Arthur | 99.1 | 89.9 | 73.6 | 11.5 | 54.4 | 47.2 |

| | 1994 Drill strip trials | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | St. Gr. yield | ESI | Flour ash | Cookie diam. | Friab | Break flour | AWRC | Prot. % |
| | | | | Lafayette, IN | | | | |
| Patterson | 75.6 | 11.2 | .34 | 17.7 | 28.4 | 38.0 | 51.8 | 9.0 |
| Caldwell | 76.0 | 11.4 | .34 | 18.1 | 28.7 | 41.3 | 51.7 | 8.7 |
| Clark | 74.2 | 12.9 | .37 | 17.8 | 25.6 | 35.1 | 52.7 | 9.6 |
| Grant | 76.4 | 10.6 | .36 | 18.1 | 29.0 | 40.1 | 53.6 | 9.6 |
| Arthur | 76.2 | 10.5 | .36 | 17.6 | 27.6 | 33.1 | 50.7 | 10.6 |
| | | | | Sullivan, IN | | | | |
| Patterson | 75.9 | 10.1 | .32 | 18.1 | 28.3 | 32.6 | 50.7 | 10.0 |
| Caldwell | 76.6 | 10.2 | .34 | 18.7 | 28.5 | 35.7 | 52.3 | 9.7 |
| Clark | 75.4 | 11.9 | .37 | 18.3 | 26.6 | 30.8 | 51.4 | 10.2 |
| Grant | 76.2 | 10.8 | .38 | 18.8 | 28.0 | 37.6 | 53.2 | 9.1 |
| Arthur | 76.7 | 10.4 | .38 | 18.1 | 27.9 | 28.1 | 52.6 | 11.8 |

[1] Samples were evaluated at the USDA Soft Wheat Quality Lab, Wooster, OH. The milling and baking scores are in percent of the standard cultivar (Caldwell). Adjusted yield is the percent of grain that is recovered as flour; Protein % is of the flour; AWRC is alkaline water retention capacity, low values are desirable; softness equivalent or ESI reflects the kernel softness and is an indicator of milling yield, high values are desirable.

Table 3. Disease ratings in wheat advanced yield trials, Purdue Agronomy Farm,1995

| Cultivar or line | Powdery[1] mildew 0-10 30-May | Septoria[2] leaf blotch 0-9.5 12-Jun | Glume[3] blotch % 13-Jun | Leaf[4] rust % 12-Jun | Scab[5] % 13-Jun |
|---|---|---|---|---|---|
| Patterson | 5.0 | 6.00 | 5.0 | 0.01 | 11.70 |
| Grant | 5.0 | 8.00 | 50.0 | 0.01 | 9.80 |
| 84152B1-14-5-1-15 | 2.0 | 6.00 | 1.0 | 0.01 | 5.00 |
| INW 9241 | 1.0 | 7.00 | 3.0 | 0.00 | 3.00 |
| INW 9451 | 1.0 | 8.00 | 3.0 | 0.01 | 20.00 |
| Clark | 5.0 | 9.00 | 40.0 | 15.00 | 20.00 |
| Caldwell | 7.0 | 7.50 | 5.0 | 0.50 | 7.00 |
| Auburn | 1.0 | 7.00 | 3.0 | 0.01 | 35.00 |
| Abe | 1.0 | 8.00 | - | - | - |
| Pio 2548 | 2.0 | 8.00 | 3.0 | 0.01 | 30.00 |

[1] Powdery mildew is rated on the Lipps scale: 0=trace % leaf area covered; 1=F-3 with 1-50%; 2=F-2 with 1-5%; 3=F-2 with 5-15%; 4=F-2 with >15%; 5=F-1 with 1-5%; 6=F-1 with 5-15%; 7=F-1 with >15%; 8=F with 1-5%; 9=F with 5-15%; 10=F with >15%. F denotes the flag leaf, F-1 the first leaf below the flag leaf, etc.

[2] The 0-9.5 scale reflects the height to which symptoms have progressed on the plant and the total percentage of symptomatic leaf tissue. For each scale value, the highest leaf showing symptoms and the range of severity for that leaf are as follows: 3=20-40% on F-3; 4=1-10% on F-2; 5=10-25% on F-2; 6=1-10% on F-1; 7=10-50% on F-1; 8=1-20% on F; 9=20-90% on F; 9.5=90-100% on F. See footnote 1 for meaning of F, F-1, etc. Both *Septoria tritici* and *S. nodorum* cause leaf blotch.

[3] Glume blotch is rated as the percentage area of the spike surface area showing symptoms.

[4] Leaf rust is rated as the percentage of the flag leaf area that is covered by pustules, on the modified Cobb sca

[5] Scab is rated as the percentage of spikes in a plot that show symptoms of scab.

Table 4. Disease ratings in wheat performance trials

| | 1995 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | PM[1] 0-10 | SLB 0-9.5 | | GB % | LR % | | Scab % | |
| Cultivar or line | DC[2] 7-May | DC 7-Jun | PAF[2] 13-Jun | PAF 13-Jun | DC 7-Jun | PAF 13-Jun | DC 7-Jun | PAF 13-Jun |
| Caldwell | 1.8 | 9.10 | 7.75 | 4.0 | 2.75 | 1.88 | 9.25 | 15.00 |
| Clark | 0.5 | 9.00 | 7.50 | 4.0 | 60.00 | 17.50 | 7.50 | 27.50 |
| Grant | 1.8 | 8.95 | 7.25 | 8.8 | 8.00 | 1.88 | 9.25 | 17.50 |
| Patterson | 1.3 | 8.38 | 6.75 | 3.0 | 0.70 | 2.25 | 3.50 | 20.00 |
| 84152B1-14-5-1-15 | 0.0 | 8.20 | 7.25 | 3.5 | 1.12 | 0.75 | 5.00 | 4.50 |
| Cardinal | 1.0 | 8.55 | 6.75 | 4.5 | 7.00 | 3.00 | 1.62 | 4.50 |
| Pio 2548 | 0.0 | 8.62 | 7.00 | 8.3 | 0.90 | 0.75 | 0.75 | 11.25 |
| Pio 2571 | 1.0 | 7.75 | 6.25 | 4.0 | 0.00 | 0.00 | 0.30 | 9.50 |
| $LSD_{.05}$ | 0.7 | 0.41 | 0.66 | 4.0 | 10.73 | 3.37 | 5.38 | 7.22 |

| | 1994 | | | |
|---|---|---|---|---|
| | SLB 0-9.5 | | LR % | |
| | DC[2] 7-Jun | PAF[2] 13-Jun | DC 7-Jun | PAF 13-Jun |
| Caldwell | 7.15 | 6.51 | 8.75 | 1.10 |
| Clark | 6.88 | 6.22 | 43.75 | 6.50 |
| Grant | 6.58 | 6.24 | 0.50 | 0.51 |
| Patterson | 7.05 | 6.35 | 0.00 | 0.00 |
| 84152B1-14-5-1-15 | 6.80 | 6.30 | 0.00 | 0.03 |
| Cardinal | 6.68 | 5.80 | 0.25 | 3.25 |
| Pio 2548 | 6.62 | 6.49 | 1.00 | 0.04 |
| Pio 2571 | 6.38 | 5.70 | 0.00 | 0.01 |
| $LSD_{.05}$ | 0.36 | 0.55 | 7.50 | 3.25 |

Table 4, contd. Disease ratings in wheat performance trials.

| | 1993 | | | | |
|---|---|---|---|---|---|
| | PM 0-10 | | SLB 0-9.5 | | LR % |
| Cultivar or line | DC[2] 4-Jun | PAF[2] 10-Jun | DC 4-Jun | PAF 10-Jun | DC 11-Jun |
| Caldwell | 7.50 | 6.25 | 8.25 | 7.12 | 4.50 |
| Clark | 6.50 | 4.50 | 8.00 | 4.88 | 23.75 |
| Grant | 6.50 | 3.25 | 7.00 | 4.50 | 0.28 |
| Patterson | 7.50 | 5.25 | 8.00 | 5.38 | 0.05 |
| 84152B1-14-5-1-15 | 7.00 | 3.00 | 6.75 | 4.75 | 0.04 |
| Cardinal | 6.25 | 4.50 | 7.00 | 4.62 | 0.04 |
| Pio 2548 | 5.00 | 3.25 | 7.00 | 5.38 | 0.52 |
| Pio 2571 | 3.00 | 3.00 | 6.75 | 4.12 | 0.00 |
| $LSD_{.05}$ | 2.24 | 1.09 | 0.61 | 0.63 | 5.27 |

[1] PM = powdery mildew, SLB = Septoria leaf blight, GB = Septoria glume blotch, LR = leaf rust. See Table 4 for description of rating scales.

[2] DC = Daviess County; PAF = Purdue Agronomy Farm

Table 5. Wheat soilborne mosaic reactions and seedling leaf rust reactions

| Cultivar or line | WSBM[1] 1-9 Univ. IL | | | Leaf rust[2] Infection type (0-4) | |
|---|---|---|---|---|---|
| | 1995 | 1994 | 1993 | 1995 | 1994 |
| Caldwell | 5.5 | 6.5 | 3.5 | 4 | 4 |
| Clark | 2.5 | 3.0 | 3.0 | 30; | 3 |
| Grant | 2.0 | 3.0 | 3.5 | 0 | 0 |
| Patterson | 4.3 | 4.0 | 3.5 | 4 | 2 |
| 84152B1-14-5-1-15 | 4.5 | 3.5 | 2.5 | 0;13- | 1+ |
| Cardinal | 7.0 | - | - | 2+ | - |
| Pio 2548 | 8.0 | 8.0 | - | 20;3 | 2- |

[1] Wheat soilborne mosaic reaction is scored based on intensity of chlorotic symptoms, degree of stunting, and reduction in tillering. 1=no symptoms; 2 and 3 = mild mosaic with no stunting; 4 and 5=mosaic with slight stunting; 6 and 7=mosaic with yellowing and stunting; 8=severe stunting and yellowing; 9= very severe stunting and yellowing and death of tillers.

[2] *Puccinia recondita* culture 941-X. Infection type is recorded on a scale of 0 to 4, as follows:

0 = Immune -- no evidence of infection
0; = Nearly immune -- no pustules, but hypersensitive flecks present
1 = Very resistant -- very small pustules with necrotic borders
2 = Moderately resistant -- small to medium pustules usually with chlorotic borders
3 = Moderately susceptible -- medium pustules, no necrosis, but some chlorosis around pustules
4 = Very susceptible -- large pustules, no necrosis, little or no chlorosis

The symbols + and - are used to indicate variation within an infection type. For example, a 1+ denotes a slightly less resistant reaction than a type 1.
If more than one infection type occurs on a leaf, the most common type is listed first, followed by the others in decreasing order of frequency.